

CLAIMS:

1. A method for the manufacture of microstructures comprising the steps of:
photolithographically producing at least one trench, said trench having at least two substantially vertical and at least one substantially vertical sides; and
forming polymer brushes by polymer grafting techniques on the inner surface of said at least one trench, the forming comprising the steps of:
 - a) adsorbing a polymerization initiator on said inner surfaces; and
 - b) polymerizing said inner surfaces.
2. The method according to claim 1, wherein said polymer brushes are formed by a member selected from the group consisting of grafting to techniques and graphing froms technique.
3. The method according to claim 1 wherein said poymerization initiator is capable of binding to functional OH-groups.
4. The method according to claim 3 wherein said polymerization initiator is azomonochlorosilane.
5. The method according to claim 1 further comprising an oxidic layer bonded to the at least two substantially vertical surfaces of the photoresist, said polymer chains bonded to the oxidic layer.
6. The method according to claim 1 wherein said microstructure has an aspect ratio of 5 and higher.
7. The method according to claim 3 wherein said microstructure has an aspect ratio of 5 or higher.
8. The method according to claim 1 wherein said polymerization initiator is coated onto the vertical walls of said trench.
9. The method for the production of microstructures according to claim 8 further comprising the steps of:

- a) applying a layer of a monomer;
 - b) starting a polymerization process of said monomer, said polymerization process forming polymer chains, wherein at least some of said polymer chains bond to said vertical walls of said trench structure;
 - c) removing said free polymer chains not bonded to said vertical walls;
 - d) forming a metallic structure; and
 - e) removing the remaining photoresist structure.
10. The method according to claim 9 wherein said polymerization initiator is applied in a rinsing step.
11. The method according to claim 10 wherein said photoresist is a P(t-BOC)styrene based photoresist.
12. The method according to claim 9 further comprising the steps of:
- a1) applying an oxidic layer to said vertical walls of said trench structure prior to starting the polymerization process; and
 - a2) removing said oxidic layer at substantially the same time as the remaining photoresist structure in step e.
13. The method according to claim 12 wherein said photoresist is a diazonaphthoquinone (DNQ) Novolak based photoresist.
14. The method according to claim 13 wherein said oxidic layer is selected from the group consisting of SiO_x and Al_2O_3 .
15. The method according to claim 12 wherein said removing of the remaining photoresist structure comprises reactive ion etching (RIE).